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(*Continued.*)

TOXICOSIS OF THE NERVOUS SYSTEM AS A CAUSE OF PULMONARY CONSUMPTION.

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THE fundamental concept of this paper is, that impairment of the integrity of the nervous system, and especially of the pneumogastric nerves, leads to some form of pulmonary disorganization, and very frequently to that condition which is known as pulmonary consumption. This was observed long ago, for as far back as 1842, Cheneau (*De l'Influence de la huitième paire dans la production de la Phthisie*, Paris, 1842) attributed this disease directly to disordered pneumogastric innervation. In 1850, Dr. J. C. Holland defined pulmonary consumption as a disease of the nervous system. (Ancell's *Treatise on Tuberculosis*, p. 556). Dr. Copland (*Dictionary Practice of Medicine*, part XV, p. 750) regarded this disease as being dependent on an abnormal condition of the nervous system. Dr. Laycock says (*Medical Times and Gazette*, 1862, p. 205) that defective pneumogastric innervation consequent upon a loss of cerebro-spinal power, is a very common predisposing and exciting cause of phthisis In the *Medical Times and Gazette* (1871, Vol. II, p. 613) Dr. Clifford Allbutt, under the heading of "Phthisis as a Neurosis," in discussing the question of the relationship between phthisis and the nervous system, states that "the more I study this, the more I am satisfied that the lung mischief is also a neurosis—by which I mean that the lesion is one not originating in the local tissues, but in the nervous system." More recently (1891), Dr. T. S. Clouston, in his interesting and valuable lectures on the "Neuroses of Development," makes the statement that facts "seem to show that if tuberculosis (phthisis) cannot itself be called a neurosis, it is in most cases dependent for its existence on a trophic neurosis, or has the closest affinity to it."

In addition to the testimony which comes from these eminent sources, there is scattered through the literature of medicine, a richness of clinical cases which directly support the theory that phthisis and other pulmonary disorders follow injury and disease of the nerve supply of the lungs. I have collected and tabulated a large number of these cases in my brochure on "Pulmonary Consumption a Nervous Disease." The evidence which accrues from these instances is, by reason of its nature, more exact and weighty than if it had been worked out in the laboratory. Laboratory work only becomes really valuable when it is confirmed by the crucible of clinical experience, and by *post-mortem* results; but here nature herself performed the experiment, and with the most uniform products.

Now, in what follows, I hope to be able to demonstrate that there are a varied number of agents generated within the body and introduced into it from without, which intoxicate the nervous system with such severity, that they become a prolific source of pulmonary consumption. These poisons are alcohol, syphilis, mercury, lead, typhoid fever, diphtheria, measles, whooping cough, mumps, influenza, cerebro-spinal meningitis, beriberi and rheumatism.

ALCOHOL. Among the agents which are most potent in the production of pulmonary consumption, through the instrumentality of the nervous system, I would give the first place to alcohol. Dr. James Jackson, in this country, and Dr. Wilks, in England, were, I believe, the first to investigate its morbid effects on the nervous system, and called the same alcoholic paralysis, which is now known under the name of alcoholic neuritis. This disease is characterized in its early stages by numbness, tingling, hyperæsthesia in the extremities, and later on by anæsthesia, paralysis of motion, loss of knee-jerk, quickened pulse, shortness of breath, and frequently by pulmonary embarrassment. In females, the catamenia are almost always suppressed, and often for many months during the illness. Paralysis of respiration and of deglutition is common. Pneumonia, which occasionally terminates the case, is very likely due to lesions of the vagus. (Ross).

Drs. Oppenheim and Siemerling give the history of a male, aged 26. (*Archiv f. Psychiatrie u. Nervenkrankheiten*, Bd. 18, S. 114), who was received on account of delirium tremens, and who had been addicted to alcoholic excess for years. About five months before his death, infiltration of both apices began, and he died of pulmonary phthisis. On microscopic investigation, the oblongata, the posterior columns, and all the nerves which were examined were found in a state of degeneration.

Thomsen (Ibid. Bd. 19, p. 191) cites the case of a chronic alcoholic, aged 48, who died from dyspnœa, distress in chest and in throat. Post mortem examination showed pulmonary atelectasy and broncho-pneumonia, hyperæmia of the oblongata, and a greyish color of the cranial nerves. The nucleus of the hypoglossus was excessively degenerated. The condition of the vagus could not be definitely ascertained.

Vierordt (Ibid. Bd. 18) relates the history of a chronic alcoholic, aged 30, who died from pulmonary phthisis. After death it was found that the oblongata, the cervical and the dorsal portion of the spine were much degenerated.

Schultze (*Neurolog. Centralblatt*, Bd. 6, 1887, p. 271) reports the case of a male, aged 39, who was a chronic alcoholic and also diabetic. His death was caused by paralysis of respiration. The oblongata and the nuclei of the vagus and hypoglossus were degenerated.

Strümpell (*Archiv. f. Psych. u. Nervenkrankh.*, Bd. 14, S. 339) gives the case of a chronic alcoholic who finally developed and died of pulmonary phthisis. Death came through respiratory disturbance and general exhaustion. The spinal cord was normal, but all the peripheral nerves which were examined were found to be diseased. The author in commenting on this case says that the paralysis of respiration is of great clinical importance, and "whether tuberculosis has any relationship to neuritis, we do not know, but it is important to notice that in many of the recorded cases of multiple neuritis, tuberculosis co existed."

Ross (*Medcial Chronicle*, May, 1890, p. 91) reports the case of a chronic alcoholic, aged 35, who during his last few months of life became phthisical. Dyspnœa was marked, and after death the vagi, phrenici and the anterior tibial nerves were found to be degenerated.

Déjerine (*Deutsche Med. Zeitung*, 1887, p. 711) contributes the case of a chronic female alcoholic, aged 46, who had a pulse rate of 150 to 160, and who died of pneumonia. There was neuritis of the cutaneous and muscular nerves, and of both vagi.

Sharkey (*Trans. Lond. Path. Society*, 1888, p. 27) relates the history of a female, aged 32, who was addicted to the abuse of alcohol. Finally she became subject to hæmoptysis, great dyspnœa, and accelerated pulse and died from failure of respiration. After death both lungs were found phthisical, the dorsal and cervical regions of the cord, the vagi, phrenici and other nerves were diseased.

SYPHILIS. That pulmonary consumption is frequently generated through syphilitic infection is evidenced by the fact that most writers on chest diseases recognize a separate affection of the lungs as syphilitic phthisis. Like alcohol, this poison has an affinity for the nervous system, and therefore exerts its tertiary toxic action on this tissue. It may attack any nerve tissue, but it seems to affect the cranial more frequently than the peripheral nerves. Its intoxicating influence shows itself in pain, hyperæsthesia, anæsthesia, neuralgia, spasm, and paralysis in the course of nerve tracts, on the one hand, and in infiltration and degeneration of the same, on the other.

Naunyn (*Deutsches Arch. f. Klin. Med.*, Bd. 34, p. 433) cites the case of a female, 19 years old, who was always well until six months before her admission, when she acquired syphilis. Some time after her admission she became subject to a violent cough, dyspnœa and all the symptoms of phthisis, which was confirmed by a physical examination of her lungs. After death it was found that both lungs were degenerated as well as the oblongata and the cervical and dorsal portions of the spinal cord.

Penzoldt (*Centralblatt f. d. med. Wissenschaft*, 1874, p. 474) contributes the case of a female suffering from tertiary syphilis, which was followed by paraplegia and inspiratory dyspnœa. Pneumonia occurred, and tracheótomy was performed in order to relieve the impeded respiration, but the patient died, and it was then discovered that both vagi and accessorii were atrophied.

Buss (*Ibid.* p. 195) gives the history of a female, aged 29, who, after being infected with syphilis, became hemiplegic, and finally died from pulmonary phthisis. Section showed degeneration of the oblongata.

Echeverria (*Journal of Mental Science*, Vol. XXVI., p.

165) contributes the following case of a female, aged 26, who, after she had acquired syphilis, began to have epilepsy. After this the apices of her lungs became infiltrated, and post mortem examination showed degeneration of the oblongata. The fibres of the right pneumo gastric nerve were invaded.

Eisenlohr (*Centralblatt f. Nervenheilkunde*, 1887, Vol. X., p. 12) describes the case of a syphilitic male, aged 30, who died of pulmonary phthisis. On section it was found that nearly the whole spinal cord from the medulla to the sacral region was diseased.

Vierordt (*Archiv f. Psychiatrie*, Bd. XIV., 1883, p. 678) contributes the history of a syphilitic female, aged 35, who began to suffer with pain and atrophy in the lower extremities. Respiration was accelerated, and there was only partial contraction of the diaphragm. Section developed that she suffered from phthisis, and that both vagi were diseased.

Köhler (*Prager Zeitschrift f. Heilkunde*, Bd. VIII., 1887, p. 1) gives the following: Male, aged 29, was suddenly attacked with partial hemiplegia. His thoracic organs were normal at the time. On inquiry it was found that three months previously he had acquired a syphilitic sore. Three months after his hemiplegic attack he began to complain of pain in his neck, spine and thorax, and in three months more he was dead of phthisis. The autopsy showed the existence of small cavities in both lungs, and sclerosis of the motor oculi and facial nerves; and the pons, the oblongata and the cranial nerves were in a state of degeneration.

Vierordt contributes the following case (*Neurolog. Centralblatt*, Bd. III., 1883, p. 180): Three years after a female, aged 23, had contracted syphilis, she began to complain of loss of motion and of impaired sensation in the lower extremities, and gradually developed all the symptoms and signs of multiple neuritis. In a short time paralysis of the diaphragm set in accompanied by a high pulse rate. Death followed. The lungs were phthisical; there was degeneration of all the peripheral nerves; the right vagus was atrophied.

MERCURY. It has long been known that mercury causes serious lesions of the nervous system, such as tremor, paralysis, etc., but I do not think that we are generally aware of the fact that the victims of mercurial intoxication are prone to fall victims to pulmonary consumption, and I am chiefly indebted for what I know of this subject to the invaluable work of Dr. Adolph Kussmaul on the *Untersuchungen über den Constitutionellen Mercurialismus* (Würzburg, 1861), and from which I shall take the liberty of making the following quotations:

Walter Pope (*Philosophical Trans.*, Vol. I., p. 21, 1665) states that the laborers in the mercury mines of Friaul all become paralytic and hectic sooner or later, and that their sufferings frequently terminate in pulmonary consumption.

Scopoli (1786) noticed that the workers in the mercury mines of Idria become affected with profound weakness and tremor, cough, asthma, hemoptysis and phthisis.

Ramazzini (1700) says that laborers in mercury suffer from tearing pains, dizziness, stammering, convulsions, marked oppression and constriction of the chest, bronchitis, asthma, hemoptysis and phthisis.

The English war vessel "Triumph" anchored in the harbor of Cadix in 1810, and one month later a Spanish ship laden with a cargo of quicksilver was wrecked near by. About 130 tons was saved and brought on board of the "Triumph." By accident the metal was spilled, and distributed itself generally among the furniture and living apartments of the ship. Within three weeks 250 of the crew were salivated and suffered from tremor. The mercury was especially poisonous to those who were predisposed to disease of the lungs. Five of the men who were always well rapidly developed phthisis, and two of them died.

Burdin (1821) states that individuals who are exposed to the fumes of mercury become sufferers from debility, tremor, dizziness, anæmia. The intellect and memory wane, often an idiotic condition supervenes, and death from phthisis or apoplexy usually follow.

Dr. Bäumler (1860) gives this interesting family history: Male, aged 69, always healthy before he became a gilder at the age of 39, at which he worked for twenty-five years, but was finally compelled to seek other work on account of serious mercurial intoxication. He was married three times, and all his wives followed the occupation of gilding. From the first union there were four children of whom one died of gangrene of both feet, and the other three and the mother died of pulmonary consumption. From the second union there were two children who with their mother died of pulmonary consumption. From the third union all the children who were born before the mother began gilding were healthy, while one who was born after this period was a weakling, and died of cause not given, but the mother died of pulmonary consumption.

Dr. Kussmaul gives the following causes of death of 56 persons who were affected with mercurial intoxication: Pulmonary tuberculosis, 39; pneumonia, 3; pleurisy, 2; suffocative catarrh, 1; senile marasmus, 2: tubercular meningitis, 1; apoplexy, 5; varioloid, 2; scirrhus hepatis, 1.

These statistics show that mercurialism has a powerful tendency towards the production of pulmonary phthisis, and other diseases of the lungs. Of the 56 persons whose causes of death are here recorded, 71 per cent. died of pulmonary phthisis, and altogether 78.57 per cent. died of diseases of the lungs; while, with the exception of three, two of whom died of varioloid, and one of cancer, the others died of some nervous or wasting disease. Reckoning the general death rate from phthisis among adults at 18 per cent., this would give a mortality of the same disease among sufferers of mercury poisoning about four times greater.

LEAD. This is another metal which has the power of deteriorating the nervous system and of producing pulmonary phthisis. In fact it appears that metallic poisons, on account of being more slowly eliminated from the animal body, are more liable to exert a prolonged destructive action on the nervous system than vegetable poisons, and it is exceedingly interesting to observe that both mercury and lead are more slowly excreted than the other metals. This is a most plausible reason why these two poisons should be more intimately associated with chronic nervous and pulmonary diseases than the other members of their class.

The nervous affections which are produced by lead are well enough known, but I do not think that we are equally familiar with its power to generate pulmonary consumption. On this point, Naunyn states (*Ziemssen's Handbuch der Intoxicationen*, p. 263) that the complications which terminate lead disease are pulmonary phthisis, pneumonia, pleurisy and nephritis. In the *British Medical Journal* (August 19, 1893, p. 415), Dr. Robinson gives an interesting account of the liability of the lead miners of Weardale in England to pulmonary consumption. It appears that lead mining has been carried on in this region since the year 1401. In the Stanhope division of this region, twenty-three deaths occurred from 1885 to

1892 among the lead miners, five of which were ascribed to pulmonary consuption, seven to bronchitis, two to injuries, and one each to pneumonia, pleurisy, general tuberculosis, cystitis, chronic gastric catarrh, apoplexy and hæmoptysis—fifteen out of the whole number being therefore due to chest affections, or about 65 per cent. Among nine retired old lead miners who died in this same division during the eleven years previous, eight had diseases of the chest.

Besides the lead mining population in the Weardale region, the latter contains a larger number of inhabitants who are engaged in farming and in quarrying limestone—the condition of the houses, the character of the soil, and the climate being almost the same for the whole region. The mortality statistics which have been gathered by Dr. Robinson show that pulmonary consumption is from two to three times more prevalent among the lead workers than it is among the farmers or quarrymen living in this locality, or among the general population of England and Wales.

Moreover, lead is not only capable of greatly increasing the liability to pulmonary phthisis, but my experience leads me to say that it produces a form of this disease which is peculiar, inasmuch as the dyspnœa and other nervous symptoms are more clearly emphasized from the beginning, and which is less amenable to curative measures than the disease is generally.

TYPHOID FEVER is a disease which is characterized by certain inflammatory and ulcerative lesions of the solitary and agminated glands of the intestinal canal. It is the product of a specific poison, which, besides its deteriorating influence on the lymphatic glands of the small intestine, has an intoxicating action on the nervous system. Ross says (*Diseases of the Nervous System*, p. 975) that numerous nervous disturbances, such as insanity, aphasia, temporary hemiplegia, hyperæsthesia, involving a considerable portion of the limbs and trunk, neuralgic pains in the muscles of the limbs, neck, thorax and abdomen, paralysis and degeneration of the tibial and peroneal nerves, paralysis of the abductors of the glottis, and of the external rectus muscle, paraplegia, acute ascending paralysis, progressive muscular atrophy, ataxia, and other chronic affections may be established during an attack of, or convalescence of typhoid fever. This indicates, therefore, that the central, as well as the peripheral nervous system may become deeply implicated in this disease, which is further confirmed by the researches of Dr. A. Lewin (*Beiträge zur Pathologie der n. Vagus*, 1888), which show that in twenty six cases of typhoid fever which he examined, degeneration of the vagus existed in every instance.

Louis made the observation that inflammation of the lungs is more frequent in typhoid fever than in any other acute disease, and that young persons who make an imperfect convalescence from this fever, frequently fall into an acutely course of pulmonary consumption. Murchison says that an attack of typhoid fever is often followed by destructive disease in the lungs. Dr. John Harley states (*Reynold's System of Medicine*, Vol. I., p. 378) that "in upwards of thirty cases (typhoid fever) examined by myself, I have found the lungs free from the effects of more or less extensive inflammation only twice."

DIPHTHERIA. Of all the acute exanthematous diseases diphtheria seems to be the one which is most frequently followed by sequelæ of the nervous system. These manifest themselves primarily in loss of motion and sensation in the pharynx and larynx, in impairment of taste and in defective vision due to lameness of the ocular muscles. In some cases there is complete loss of power in the legs, which seem to be more prone to become implicated than the arms. Paralysis of the bladder, delirium and convulsions have occurred. The heart and lungs become seriously embarassed through the action of the diphtheritic poison on the circulatory and pulmonary nerve supply. Retardation of the pulse and paralysis of respiration seem to be the result, as Ross says (op. cit. p. 977), of a primary irritation followed by paralysis of the vagus. Squires states (Reynold's System, vol. I., p. 125) that loss of power and of sensibility in the parts supplied by the par vagum occur at a somewhat earlier period in this disease than the paralytic affections of other parts of the body. Dr. Gull reports the case of a boy, aged 11, who, five weeks from the commencement of diphtheria, was unable to prevent the head from falling forward, or to either side, owing to paralysis of the muscles of the neck. He suffered from dysphagia, aphonia and paroxysmal dyspnœa, and in a few days the breathing became entirely thoracic—the diaphragm being unmoved in inspiration or expiration, indicating a loss of power in the phrenic nerves. Death came rapidly through apnœa.

Mendel (*Centralblatt für Nervenheilkunde*, Bd. VIII., 1885, p. 102) relates the case of a boy, aged 8, who was taken ill with diphtheria, and this was followed by paralysis of the muscles of the throat, eye and face, and by hyperæsthesia and coldness of the lower extremities. The pulse was 100, and the temperature 38.5°. Physical signs of bronchitis developed, and albumin was found in the urine. Death was caused by embarassed respiration. On section hyperæmia and extravasation were found along the vagus and abducens, and their fibres were in a state of degeneration.

Shech reports the following case (*Archiv f. Klin. Med.*, XXIII., p. 2): A child, 7 years old, one month after having passed through an attack of diphtheria began to suffer from dysphagia and hoarseness, and expelled all forms of nourishment in violent fits of coughing. Complete loss of motion and of sensation in the larynx. Death came through pneumonia. Both inferior laryngeal and vagi nerves had undergone fatty degeneration.

MEASLES is another acute eruptive disease which is extremely prone to give rise to disorder of the pulmonary organs. According to Copland there is a special tendency to consumption in those who suffer from its attack after having passed the period of puberty. Ringer asserts (Reynold's System, Vol. I., p. 198) that " acute tuberculosis or chronic phthisis may occur during the course of the disease, but it usually first gives evidence of its existence after the fever has declined. Acute tuberculosis follows measles more frequently than any other of the acute specific diseases, whooping cough being, perhaps, excepted." Some attribute the lung changes to an extension of the inflammatory condition along the bronchial tract to the pulmonary tissue, while others, among whom is Ruehle, incline to the belief that they are due to infiltration and caseation of the bronchial glands which are involved in the process. The two following cases appear to show that compression of the vagi by enlarged bronchial glands incidental to measles may be the cause of pulmonary phthisis.

Baseir cites (*Jahrbücher für Kinderheilkunde*, 1878, S. 414) the case of a female child who had measles in the spring of 1876. In the following fall she was found to have infiltration of the right apex and mucous rales over the remainder of her chest. After death a cavity was found in her right lung, and the right vagus was compressed by enlarged lymphatic glands. Barlow (*Lond.*

Path. Soc. Trans., Vol. xxx., p. 254) contributes the case of a seven months' old child who suffered from lung disease since he had measles. Section showed cavity in right lung, and compression of right vagus by an enlarged bronchial gland.

WHOOPING COUGH. Most authorities are agreed that whooping cough is essentially a nervous affection ; that its virus has a specific toxic influence on the respiratory nerves, and that of all the acute contagious diseases, it is the one which is most liable to be attended and followed by disorders of the lungs. Dr. Copland writes, "I believe that the disease is chiefly nervous in simple cases; that it preserves this character, more or less, throughout, even when inflammatory complications ensue; and that in the uncomplicated state, the nervous affection never proceeds beyond irritation. . . . The inflammatory appearance in the medulla oblongata and base of the brain may be owing to the functional relation of these parts to the respiratory order of nerves which receive the first impression of disease." Hufeland, Hoffman, Wendt, Walshe and Puldame ascribe the principal seat of whooping cough to irritation of the pneumogastric nerves, and Guibert to that of the general nervous system.

The pulmonary pathology of whooping cough is, therefore, of great interest, inasmuch as it shows the manner in, and the extent to which pulmonary changes may follow in the wake of an influence which operates solely through the nerve supply of the lungs. Here, if anywhere, should be found the strongest evidence in favor of the neurotic theory of the origin of pulmonary disease.

The evidence goes to show that in all severe cases of this disease, there is congestion of the pharyngeal, laryngeal and bronchial mucous membrane, and of the lungs together with dyspnœa, and feebleness of the respiratory sounds. There may also be a shade of dulness in some parts of the lungs. The heart's action is weak, the pulse is rapid, and emaciation and exhaustion are constant symptoms. Epistaxis and hæmoptysis occur generally. Emphysema, broncho pneumonia and phthisis are frequent complications, especially in the offspring of those who bear a history of chest disease.

MUMPS, as a rule, is a mild specific contagious disease, but when complicated, I am convinced that in some way it is a forerunner of pulmonary consumption. One example of this especially impressed itself on my mind. It was that of a boy, sixteen years old, who, while suffering from this disease experienced a severe pain in his left chest and in his left testicle. The latter organ did not swell, but its pain and that in the chest was almost wholly relieved by hæmoptysis. From that time on, he began to cough and to show evidence of physical degeneration of the left lung, and died of phthisis before he was quite twenty years old. There is a marked phthisical heredity in the family.

Bartholow says (*Practice of Medicine*, p. 773) that "during the late war, the cases of mumps were accompanied by high fever, often delirium, and by great depression of the vital powers; pneumonia was a not infrequent complication, and those who recovered had a tedious convalescence, the blood being much impoverished and the body emaciated. . . . In some persons, the subjects of a dyscrasia, the morbid condition is awakened from its dormant state by an attack of mumps. The tubercular diathesis is the most common of these."

INFLUENZA. Whatever the precise etiology of influenza may be, it must be recognized that all the varied outward manifestations of the disease, are but an expression of the disturbance which exists in the nervous system below. The organs which are most commonly involved in this manner are the lungs, the heart, and the intestinal canal; and the synonyms, *peripneumonia notha, peripneumonia catarrhalis, pleuritis humida, catarrh pulmonaire, defluxio catarrhalis, etc.*, which have been used by the older writers, while failing to recognize its specific nature, are clear descriptions of the external phases of this disease.

Among the early symptoms of influenza, are severe and often excruciating headache, drowsiness, delirium, vertigo, bluntness of the senses, cold feeling along the spine, rigors, fever, sometimes profuse sweating, pain in the neck, shoulders, arms, back and legs; great lassitude and extreme prostration. Then comes a paroxysmal cough, which is sometimes dry, but frequently attended by stringy, tenacious and bloody expectoration, hoarseness, dyspnœa and threatened suffocation. The pulse may be strong at first, but soon becomes soft and feeble, and may be very slow.

The morbid anatomy of influenza is principally seen in the meninges of the brain, spinal cord, peripheral nerves, lungs and heart. The brain and spinal cord are congested, and are dotted with hemorrhagic spots, and degenerative changes occur in the axis-cylinders and nerve fibres. Pulmonary œdema, broncho-pneumonia capillary bronchitis and pleurisy are its frequent accompaniments. Frequently, collapse of a lung, or of part of a lung supervenes.

The pulmonary disease in influenza was believed by Graves to be due to paralysis of the vagi. Walshe says (*Diseases of the Lungs*, p. 563) that "this poison seems specially to exercise its influence on parts supplied by the pneumogastric nerve; and it is worthy of remark that whooping cough, an affection in which that trunk is indubitably concerned, has often been noticed to prevail concurrently with influenza."

URICACIDÆMIA. Notwithstanding the opinion which prevails in some quarters that rheumatism and gout are antagonists of pulmonary consumption, I believe that uric acid is in some way closely connected with, and is probably responsible for the existence of the latter disease in many instances. I do not refer here to those cases of phthisis which are more or less dependent on a valvular lesion of the heart originally caused by rheumatism, but to those in which there is an active and painful manifestation of the rheumatic poison in the joints, more or less severe, throughout the course of the disease. The affinity between asthma and bronchitis on the one hand, and gout and rheumatism on the other, is well recognized by noted authors who have written on the gouty and rheumatic aspects of these diseases, and it is quite probable that the relationship between pulmonary consumption and gout and rheumatism is equally well assured. Indeed, there is strong evidence for believing that the close alliance which exists between the above-named diseases, is brought about through the toxic action of uric acid on the nervous system. For according to Dr. Alexander Haig, of London, whose studies* on uric acid as a cause of disease have opened a wide and fertile field for practical medicine, a number of nervous diseases like migraine, epilepsy, hysteria, convulsions, etc., are frequently produced by uric acid poisoning. In this work he contributes many facts which go to prove the pernicious influence of this agent on the nervous system, and especially on the vaso-motor nerves, and in view of such an action, it is not very hard to conceive that uric acid may play an important part in the causation of pulmonary consumption. One thing is sure, and that is that hæmoptysis is very frequently a beginning sign of pulmonary phthisis, and that there are cases of phthisis with hæmoptysis which are associated at the same time with rheumatic swelling and pain in some, or perhaps all of the joints in the body, which are promptly and effectively relieved, both in so far as the bloodspitting and the articular pain are concerned, by the salicylates. The question arises here as to whether the uric acid which is responsible for the rheumatic outbreak is also accountable for the hæmoptysis. I believe that it is, and I furthermore believe that this toxic agent induces hæmorrhage from the lungs by disintegrating the vaso-motor nerves, and thus weakens the walls of the pulmonary capillaries; and that in accordance with Dr. Haig's view, the salicylates clear the blood of this poison and lower the tension in these vessels. Both, mercury and the iodides have a similar effect, but are inferior to the salicylates. This is confirmed by Mr. J. E. Frazer, now resident of the Royal National Hospital for Consumption in Ventnor, who states* that he has often seen the iodide of mercury used with benefit in hæmoptysis due to uricacidæmia, but found that the hæmoptysis returned, if this treatment is left off and is not followed by the salicylates.

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*Uric Acid in Causation of Disease. By Alexander Haig. London. Churchill. 1896.

Aside of its toxic effect on the vaso-motor nerves, the researches of Dr. Haig clearly make out that uric acid has a pernicious influence on the central nervous system, and according to the theory here advocated, it paves the way for the oncoming of pulmonary consumption. Whether this is true or not, experience has taught me the importance of bearing in mind the salicylates, even in small doses, when prescribing for cases of phthisis.

RÉSUMÉ, AND DEDUCTIONS. Owing to their manner of action, the poisons, which form the basis of this paper, may be separated into two groups. First, those which bring about a slow intoxication of the nervous system, and which induce a crop of chronic pulmonary diseases; and second, those which act more or less acutely and which produce a crop of acute diseases of the lungs, and which subsequently merge into well settled phthisis. The former group includes alcohol, syphilis, mercury, lead and uric acid, while the latter comprises typhoid fever, diphtheria, measles, whooping cough, mumps and influenza. To these poisons might also be added those which engender beriberi, pellagra and cerebro-spinal meningitis.

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* Haig. Op. cit., p. 179.

While the ultimate trend of all these poisons is to undermine the nervous system, and to bring on pulmonary disorder, it must be understood that the chronicity or the acuteness of the latter process depends in a large measure on the virulency of the poison, on the amount and frequency with which it is introduced, on the persistency of its action, and on the facility or difficulty with which it is excreted by the body. In these particulars they vary greatly. Alcohol is eliminated rapidly through the lungs and the kidneys, and would not be attended by such serious danger to the economy, were it not for the fact that the chronic "tippler" takes it frequently and for a protracted period. In the case of syphilis, a single infection is capable of saturating the whole body for a long time. Mercury and lead enter the body gradually, either by being inhaled or ingested, and are eliminated exceedingly slowly. A comparatively small quantity of these poisons suffices therefore, to work grave and irreparable injury to the nervous system. Of all the poisons in the first group, uric acid is probably the most harmless, and being a normal constituent of the body, it only becomes dangerous when present in excessive quantity and for a protracted period. The members of the second group also differ somewhat in the rapidity with which they generate pulmonary disintegration. The poisons of whooping cough and influenza having a special affinity for the pulmonary nerves, bring about this result more rapidly and in a larger number of instances, than is the case with those of typhoid fever, diphtheria, measles and mumps, whose action on the nervous system is probably more general.

DISCUSSION.

Dr. WILDER, in discussing this paper, said: I congratulate the Association on this paper, especially in respect to the effect of alcohol upon the nervous system. In our public schools there are sometimes taught things that do not agree with the experience of mankind. It is of the highest importance that certain over-zealous reformers and ill-informed legislators should realize that the effects of alcohol upon the body are still under investigation by scientific experts.